

THE CYTOGENETIC EFFECTS OF DAILY IN VIVO EXPOSURES TO LOW DOSES OF GAMMA RADIATION IN MICE

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Previous studies have shown that small doses of radiation can induce an adaptive response in many organisms, causing them to become less susceptible to damage by subsequent acute doses of radiation. We decided to determine whether a similar adaptive response could be induced by long-term, daily *in vivo* exposures of mice. SWR X C57BL/6 F1 mice were exposed to 0.6, 1.9 and 5.5 cGy of ^{137}Cs at the same time every day for 21, 42 and 63 days. Five to ten female mice were used for each combination of exposure and duration. Ten control mice were used which were not exposed to radiation but were handled and housed in an identical fashion as the other mice. Acute exposures were also performed *in vivo* at doses of 37, 73, 110, 219 and 329 cGy with four mice at each exposure level. Peripheral blood samples were obtained via cardiac puncture two weeks after the final exposure and cultured for 38 hours, the last 12 in the presence of Colcemid. Metaphase cells were prepared and chromosomes 1 and 3, and 2 and 8 were painted using directly-conjugated rhodamine and fluorescein, respectively. To date, at least 100 cell equivalents have been scored from each mouse for chromosome aberrations, and we plan to score 300 cell equivalents per mouse if possible. Early data suggest a significant difference in the number of translocations per 100 cells when comparing the acutely exposed mice to daily exposed mice with comparable total doses. Mice which received the same total amount of radiation showed significantly lower translocation frequencies when the dose was given over a period of several weeks. Both acute and daily exposed mice showed an increase in translocation frequency when compared to non-exposed controls. However, the variability in translocation frequencies between mice, even within the same exposure group, was high, suggesting that more cells need to be scored. Our data clearly show that an adaptive response was induced, but further scoring is needed to clarify the dose and time response. Work performed under the auspices of the US DOE by LLNL, contract no. W-7405-ENG-48.